Volunteer Lake Assessment Program Individual Lake Reports
DUTCHMAN POND, SPRINGFIELD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	114	Max. Depth (m):	3	Flushing Rate (yr[1])	1.4
Surface Area (Ac.):	28	Mean Depth (m):	1.9	P Retention Coef:	0.79
Shore Length (m):	1,400	Volume (m³):	210,000	Elevation (ft):	1543

TROPHIC CLASSIFICATION

| Year	Trophic class
1984	OLIGOTROPHIC
2003	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	The calculated median is fewer than 5 samples but > indicator and the chlorophyll a indicator is okay. More data needed.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Very Good	The calculated median is from 5 or more samples and is <= 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.
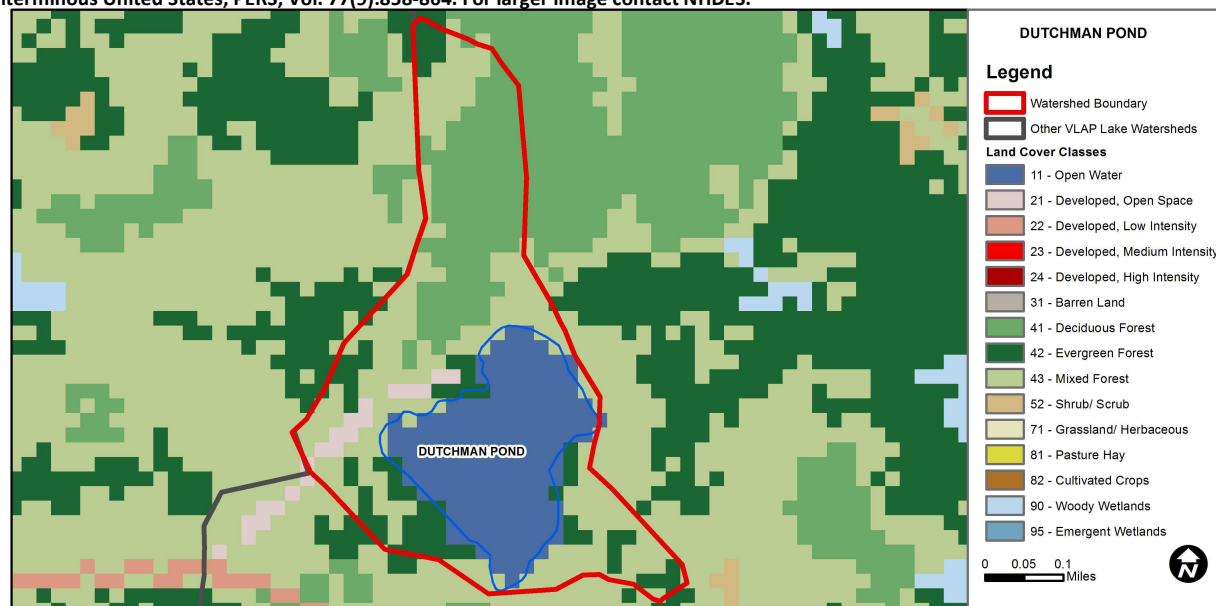
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	28.6	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	2.9	Deciduous Forest	19.06	Pasture Hay	0
Developed-Low Intensity	0	Evergreen Forest	14.29	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	36.66	Woody Wetlands	0
Developed-High Intensity	0	Shrub-Scrub	0	Emergent Wetlands	0

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics*)

- **CHLOROPHYLL-A:** Chlorophyll levels were low in August and much less than the state median. Chlorophyll levels decreased from 2013 and historical trend analysis indicates highly variable chlorophyll levels since monitoring began. In particular, chlorophyll levels have been more variable since 2010.
- **CONDUCTIVITY/CHLORIDE:** Conductivity in the pond continues to be low and much less than the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic (upper water layer) conductivity since monitoring began.
- **E. COLI:** E. coli levels at both stations monitored were much less than the state standards for public beaches (88 cts/100 mL) and surface waters (406 cts/100 mL).
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were low in August and less than the state median. Historical trend analysis indicates highly variable epilimnetic phosphorus levels since monitoring began. In particular, phosphorus levels were highly variable between 1991—2000 and since then phosphorus levels appear to have stabilized with the exception of the spike in 2010.
- **TRANSPARENCY:** Transparency was very good and the Secchi disk was visible on the pond bottom as it normally is. Historical trend analysis indicates stable transparency since monitoring began. The slight variability in pond transparency is closely related to pond water level.
- **TURBIDITY:** Epilimnetic turbidity remained low in 2014.
- **PH:** Epilimnetic pH was slightly less than the desirable range of 6.5-8.0 units. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.
- **RECOMMENDED ACTIONS:** Increase monitoring frequency to three times per summer, typically once per month in June, July and August. Increased monitoring would decreased variability in seasonal and historical water quality data and allow for better assessment of water quality trends. The VLAP satellite laboratory located at Colby Sawyer College could be utilized for laboratory pick up and drop off during the summer months. The increased frequency and intensity of storm events may be causing a slightly higher water level in the pond. This could be responsible for the increased variability in algal (chlorophyll-a) levels since 2010. This highlights the importance of maintaining a stable water level, if possible. It also highlights the importance of managing stormwater runoff into the pond from surrounding properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource for lake and watershed property owners. Keep up the great work!

Dissolved Oxygen & Temp Profile Aug., 2014
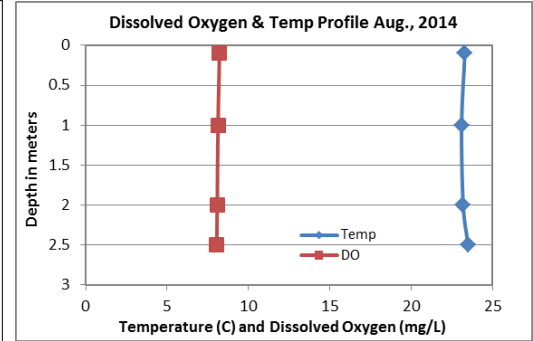
Station Name	Table 1. 2014 Average Water Quality Data for DUTCHMAN POND								
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	2.4	2.05	14.6		8	2.70	2.70	0.59	6.36
Hullschulman				10					
Soleau				10					

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Improving	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.

Historical Trend Epilimnetic Conductivity and pH

Historical Deep Spot Chlorophyll-a, Epilimnetic Total Phosphorus & Transparency Data